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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/837,911
Filing Date: April 18, 2001
Appellant(s): WANG, HUI

MAILED
JAN 19 2007
GROUP 1700

Peter J. Yim
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed October 16, 2006 appealing from the Office action mailed November 16, 2005.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

04-311591	Hirohiko	11-1992
3,880,725	Van Raalte et al	4-1975
5,326,455	Kubo et al	7-1994
5,522,975	Andricacos et al	6-1996
5,882,498	Dubin	3-1999
5,925,227	Kobayashi et al	7-1999
6,176,667	Fairbairn et al	10-2001
6,477,440	Davis	11-2002

A. Kenneth Graham, "Electroplating Engineering Handbook, second edition", Reinhold Publishing Corporation, New York (1962), pp 534-535.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Method Claims

1. Claims 110, 119, 122, 123, 127 and 129 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Japanese patent publication 04-311591A to Hirohiko (hereinafter Hirohiko).

2. The Fairbairn et al patent is directed to a wafer processing system. Fairbairn et al disclose that floor space in a clean room used for fabricating semiconductor devices is expensive. The per-square-foot construction cost, as well as maintenance cost, is high (column 1, lines 28-30). To reduce the amount of floor space required, thereby lowering capital cost per wafer processed, Fairbairn et al propose stacking processing chambers (modules) one above another vertically (column 1, lines 50-55). As shown in figure 1, wafers are removed from wafer cassette 12 by robot arm 32 and loaded into processing chambers A1 and A2. While figure 1 shows two stacked chambers, Fairbairn et al teach that as many as desired may be stacked vertically (column 3, lines 17-18). Any suitable semiconductor operation can be performed in the chambers (column 3, lines 28-30). As examples, Fairbairn et al list a number of plating processes (column 3, lines 30-31). Figure 3 shows means for supplying cleaning gas to the process chambers.

3. Independent method claim 110 differs in a first aspect from the process and apparatus of Fairbairn et al by reciting positioning the substrate within a bath in a first stacked plating module, the bath divided by a first wall and at least a second wall. Independent apparatus claims 113 and 142 include similar limitations. Hirohiko is directed to a process and apparatus for electroplating onto a wafer. As shown in figure 1, a reactor that includes vessel 11 which holds an electroplating bath is provided. This corresponds to the bath of applicant's claims. The apparatus utilizes an anode array 4 comprising a plurality of concentric anode segments. See figure 1. As shown in figures 1 and 2, the anode segments are located between concentric spacers or walls 121. These walls divide the vessel and correspond to the walls recited by applicant. As shown in figure 1, a workpiece W, which may be a wafer, is positioned such that it

is in generally confronting relationship to the anode array and walls 121. With a substrate of this configuration, a first wall is adjacent to a first portion of the substrate while a second wall is adjacent to a second portion of the substrate as recited in claims 110, 113 and 142. The apparatus of Hirohiko promotes uniformity of deposition of electroplated metal onto the workpiece (abstract).

4. Independent method claim 110 differs in a second aspect by reciting the steps of plating the film to a desired thickness on the first portion of the substrate, and plating the film to the desired thickness on at least a second portion of the substrate surface at a different radial location than the first portion "after plating the film on the first portion of the substrate surface". This limitation is considered to require a temporal difference in plating on the first and second portions. That is, plating on a second portion takes place after plating on the first portion. Since the claim is written in open form using the term "comprising", the claim is not seen as precluding deposition on the second portion while deposition is being carried out on the first portion. Similarly, the claim is not seen as precluding continued deposition on the first portion while the second portion is being plated.

5. The expression "desired thickness" is considered to include any thickness between the initial deposition thickness and the final thickness obtained at the end of the process. Therefore, while the "desired thickness" may be the final thickness, the expression is not seen as limited to the final thickness. Thus, in a process in which the entire surface is simultaneously plated, a first portion is plated to some desired thickness, while the second portion is simultaneously plated. Hirohiko indicates that precise control is needed if a plating film of precisely uniform film quality, composition and film thickness on a wafer is to be obtained (abstract; paragraph

[0002] of the translation). Hirohiko observes that when using a conventional plating device the variation in film distribution across the wafer was 7%, and that using the plating device of the invention, the difference in film distribution was 2% (paragraph [0028] of the translation.). Thus, control is not sufficiently precise to obtain perfectly uniform deposition at all radial positions, and a second portion is plated at a slightly slower rate than a first portion. As deposition across the entire substrate continues, the second portion reached the desired thickness at some time after the first portion as now recited in claim 110. Consequently, the claim is considered to read on the Hirohiko, even if the reference is interpreted to disclose plating across the entire surface of the wafer at one time.

6. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious to have utilized the electroplating vessel with first and second walls disclosed by Hirohiko as one or more of the plating chambers in the apparatus and method of Fairbairn et al because more uniform metal deposits would have been formed on the semiconductor wafers being processed. As indicated in the preceding paragraph, because Hirohiko teaches that plating is not precisely uniform, plating to a desired thickness on a second portion would occur after plating to the desired thickness on a first portion.

7. Method claim 119, as well as similar apparatus claims 135 and 158, recite flowing electrolyte in the gaps between the first and second walls at the first and second portions of the substrate, respectively. As shown in figure 1 of Hirohiko, and described in the abstract, the workpiece, such as a semiconductor wafer, is positioned in confronting relationship with the anode array and walls 121. Gaps are formed between corresponding portions of the wafer and each element of the anode array each wall 121. Hirohiko further discloses that the plating

solution is supplied from the space 122 in the inner vessel 12 and cylindrical spaces 123. Thus, the electrolyte will flow across the surface of the wafer and through the gaps between walls 121 and corresponding portions of the wafer as recited in claims 119, 135 and 158. See figure 5.

8. With respect to claims 122 and 123 Hirohiko disclose the use of concentric anode segments 4. The anodes are adjacent to the walls as shown in figure 1. Hirohiko discloses that rotary electrode 3 is a cathode electrode while elements 4 are anode electrodes. For electrodes to have been cathodic and anodic, a power supply connected to the electrodes would have been necessary.

9. With respect to claims 126, 139 and 145, Fairbairn et al teach that each of the processing chambers is adapted to carry out a specific semiconductor processing operation and mentions coating and etching operations as examples (column 3, lines 20-37). The use of different hardware and chemicals to perform a variety of different semiconductor processing operations would have been obvious in view of the teaching of Fairbairn et al.

10. With respect to claims 127, 137 and 143, Hirohiko teaches that the wafer is held on a rotary cathode electrode (abstract).

11. With respect to claims 129 and 141 the robot arm of Fairbairn et al is adapted to move in the X-Y plane which corresponds to a horizontal direction.

12. Claims 111, 112, 124, 125 and 126 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311591) as applied to claims 110, 119, 122, 123, 127 and 129 above, and further in view of Dubin et al (5,882,498).

13. Claim 111 differs from the process suggested by Fairbairn et al and Hirohiko by reciting drying the substrate by at least one of spinning the substrate or directing drying gas onto the substrate. The Dubin et al patent is directed to the production of semiconductor wafers. During the production of the wafers a number of processes are carried out. These include a step of electroplating and a spin/rinse/dry step. Dubin et al disclose that after a metal layer is formed during the electroplating process, the silicon substrate is removed from the electrolyte solution and transferred to another process chamber such as a spin/rinse/dry chamber (column 1, lines 56-60). It would have been obvious at the time the invention was made to have cleaned and dried the substrate after electroplating in the process suggested by Fairbairn et al and Hirohiko as taught by Dubin et al because electrolyte from the electroplating step would have been removed. With respect to claim 112, Fairbairn et al teaches the provision of chambers to carry out a variety of semiconductor process steps and movement between chambers by the transfer arm.

14. With respect to claims 124 and 125, Dubin et al discloses that typically a barrier and a seed layer of metal is deposited on the silicon substrate prior to placement of the substrate in the electroplating process chamber (column 1, lines 19-21). It would have been obvious at the time the invention was made to have provided a chamber in the apparatus of Fairbairn et al to have formed a seed layer and to have transferred a wafer from the seed layer chamber to the electroplating chamber because the wafer surface would have been made conductive to allow electroplating as taught by Dubin et al.

15. Claims 120 and 121 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) as applied to claims 110, 119, 122, 123, 127 and 129 above, and further in view of Andricacos et al (5,522,975).

16. Claims 120 and 121 recite the inclusion of a plumbing box and that the box includes a pump, valves, filters and plumbing connections.

17. Hirohiko shows that the electroplating solution is circulated (figure 1, abstract) but does not provide details of the equipment used to accomplish the circulation. The Andricacos et al patent is directed to electroplating onto an article such as a wafer immersed in an electrolyte bath. Andricacos et al disclose a circulation system for circulation of the electrolyte. As shown in figure 2, the system includes a pump, filter, valves and interconnecting plumbing (column 3, lines 32-35). These are the same elements recited in claims 121, 134 and157. It would have been obvious to have accomplished circulation of the electrolyte in the method and apparatus suggested by Fairbairn et al and Hirohiko using a system including a pump, valves, filters and plumbing connections because Andricacos et al shows these components to be suitable for circulating an electroplating electrolyte. As noted above, the limitations of claims 135 and 158 are suggested by Hirohiko.

18. Claim 128 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) as applied to claims 110, 119, 122, 123, 127 and 129 above, and further in view of Kobayashi et al (5,925,227).

19. Claim 128 relates to movement of the substrate. As previously noted, Fairbairn et al discloses robot arm 32 to move the substrate. This arm is capable of moving the substrate in a

horizontal plane and in a vertical direction as well. Claims 128 and 140 recite moving the substrate holder in a vertical direction. The Kobayashi et al patent is directed to apparatus for processing semiconductor wafers. The apparatus includes a transfer arm which is capable of moving in a vertical direction as shown in figure 2. Figure 3 shows substrate support members 521 which are also capable of moving in a vertical direction. It would have been obvious to have included means for moving the substrate vertically in the apparatus of Fairbairn et al as shown by Kobayashi et al to have facilitated transfer between the stacked chambers.

Apparatus Claims

20. Claims 113, 115, 116, 118, 137 and 141-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455).

21. Fairbairn et al and Hirohiko are interpreted and applied as above. Claims 113 and 142 differ by reciting a fist power supply connected to the first anode and at least a second power supply connected to at least the second anode. While Hirohiko discloses a plurality of anodes shown as elements 4, 4, ... in figure 1, Hirohiko does not specifically disclose that the anodes are connected to a plurality of power supplies. Both Van Raalte et al and Kubo et al disclose the independent control of each of a plurality of counter electrodes in an electroplating process to provide improved control of the thickness profile of the deposited metal. The Van Raalte et al patent is directed to a process and apparatus for producing desired thickness profiles in an electrodeposit. The thickness profile may be one which is substantially flat (i.e., uniform), thicker at the edges or thinner at the edges (column 1, lines 8-12). As shown in figure 2, the

apparatus may includes article 112 on which a deposit is electroplated, a body of plating material 114 which functions as an anode during deposition, and a plurality of modifying electrodes 116 which can function as anodes or cathodes during deposition. Van Raalte et al teach varying the relative electrical potentials at the article 112, the body 114 of plating material and *each one* of the modifying electrodes 116 to control the thickness profile of the deposit. See column 3, line 62 to column 4, line 11 of Van Raalte et al. Figure 2 shows a separate power supply cable to each of the modifying electrodes 116.

22. The Kubo patent is directed to a method and apparatus for producing a uniformly thick deposit of cupper to form a copper foil. To ensure that the thickness of the deposit is uniform, Kubo et al provide a plurality of thickness-uniforming sub-anodes 14. The power to each of the sub-anodes is independently controlled. See the abstract. Figure 5 shows a separate power supply cable to each of the sub-anodes.

23. As indicated with respect to independent method claim 110 above, claim 110 differs in a first aspect from the process and apparatus of Fairbairn et al by reciting positioning the substrate within a bath in a first stacked plating module, the bath divided by a first wall and at least a second wall. Independent apparatus claims 113 and 142 include similar limitations. As indicated above, Hirohiko discloses the advantage of improved uniformity due to better control in utilizing a plating vessel divided by first and second walls. It would have been obvious to have utilized the electroplating vessel with first and second walls disclosed by Hirohiko as one or more of the plating chambers in the apparatus of Fairbairn et al because more uniform metal deposits would have been formed on the semiconductor wafers being processed. Additionally, it would have been obvious to have provided separate, independently controllable power supplies

for the anode segments 4 of Hirohiko as taught by Van Raalte et al and Kubo et al because improved control of the thickness distribution of the plated metal would have been obtained. Independent apparatus claims 113 and 142 recite that the power supplies are configured to alternate is providing power to the first and second anodes. By teaching that the modifying electrodes 116 of Van Raalte et al and the sub-anodes 14 of Kubo et al are independently controllable, the references show that these electrodes are configured to alternate in providing power. Whether the electrodes are operated in such a way that alternate power is provided relates to the manner in which the apparatus is used. Structure meeting the claim limitations is suggested by the references.

24. With respect to claim 115, Fairbairn et al shows in figures 1 and 2 that robot arm 32 is movable in the X-Y plane and is capable of telescoping to position the wafers in the processing chambers. Fairbairn et al disclose that the robot arm is lifted to pick up the wafers from the cassette (column 3, lines 48-51). This movement is in the Z direction, showing that the arm can move with three degrees of freedom.

25. With respect to claim 116, Figure 1 of Fairbairn et al suggests that the robot actuator 33 which moves arm 32 is mounted on a bottom portion of the frame. The provision of a second set of plating baths and cleaning modules as recited in claim 118 is suggested by figure 2 of Fairbairn et al which shows a plurality of sets of stacked processing modules.

26. Claims 114, 138, 139 and 144-150 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) and further in

view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) as applied to claims 113, 115, 116, 118, 137 and 141-143 above, and additionally in view of Dubin et al (5,882,498).

27. Dubin et al is interpreted and applied as above with respect to the method claims, and discloses the inclusion of a spin/rinse/dry chamber in the apparatus. With respect to claims 114, 147 and 148, Fairbairn et al disclose that as many chambers may be stacked vertically as desired (column 3, lines 14-17). Provision of more than one cleaning chamber would have been obvious because throughput would have been increased. With respect to claim 146, Fairbairn et al teach the provision of chambers to carry out a variety of semiconductor process steps and movement between chambers by the transfer arm. Claim 149 is directed to apparatus but written using process language. The apparatus suggested by Fairbairn et al, Hirohiko and Dubin et al would have been capable of being operated in the manner recited by claim 149. The subject matter recited in claims 138 and 139 relate to a plating bath for depositing a seed layer and is similar to that recited in claims 124 and 125 discussed above.

28. Claim 117 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) as applied to claims 113, 115, 116, 118, 137 and 141-143 above, and additionally in view of Davis (6,477,440).

29. Claim 117 recites that the transferring mechanism is mounted on a top portion of the frame. As noted above, in Fairbairn et al the transferring mechanism is mounted on a bottom portion of the frame. The Davis patent is directed to a method and apparatus for treating semiconductor wafers. A plurality of stacked chambers is provided. Transfer mechanism 52 is

mounted on a shelf toward the upper portion of the frame. It would have been obvious at the time the invention was made to have mounted the transfer mechanism of a semiconductor processing apparatus in any position, such as a top portion of the apparatus frame as in Davis, from which the wafers could be transported to the various loading and processing chambers.

30. Claim 140 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) as applied to claims 113, 115, 116, 118, 137 and 141-143 above, and additionally in view of Kobayashi et al (5,925,227). The subject matter of claim 140 is similar to that recited in claim 128, discussed above. It would have been obvious to have included means for moving the substrate vertically in the apparatus of Fairbairn et al as shown by Kobayashi et al to have facilitated transfer between the stacked chambers.

31. Claims 151 and 152 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) and additionally in view of Dubin et al (5,882,498) as applied to claims 113, 115, 116, 118, 137 and 141-143 above, and further in view of Kobayashi et al.

Claims 151 and 152 recite limitations similar to claims 128 and 140 previously discussed. It would have been obvious to have included means for moving the substrate vertically in the apparatus of Fairbairn et al as shown by Kobayashi et al to have facilitated transfer between the stacked chambers.

32. Claims 133-135, 156-158 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Jp 04-311-591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) as applied to claims 113, 115, 116, 118, 137 and 141-143 above, and further in view of Andricacos et al (5,522,975).

33. Claims 133-135 and 156-158 recite the inclusion of a plumbing box and that the box includes a pump, valves, filters and plumbing connections, and are similar to claims 120 and 121 discussed above. It would have been obvious to have accomplished circulation of the electrolyte in the apparatus suggested by Fairbairn et al and Hirohiko using a system including a pump, valves, filters and plumbing connections because Andricacos et al shows these components to be suitable for circulating an electroplating electrolyte. As noted above, the limitations of claims 135 and 158 are suggested by Hirohiko.

34. Claims 136 and 159 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fairbairn et al (6,176,667) in view of Hirohiko (Ph 04-311591) and further in view of Van Raalte et al (3,880,725) or Kubo et al (5,326,455) and Andricacos et al (5,522,975) as applied to claims 133-135 and 156-158 above, and additionally in view of the Electroplating Engineering Handbook. All references are applied as in the previous office action.

35. Claims 136 and 159 additionally recite a temperature control. Chapter 22 of the Handbook is directed to heating and cooling equipment for use in electroplating apparatus. It would have been obvious to have provided a temperature control as recited in claims 136 and 159 because the Handbook shows temperature control equipment to be conventional and because

optimum performance during electroplating would have been obtained by controlling temperature.

(10) Response to Argument

At page 7 of the Brief, appellant argues that the Examiner's definition of "desired thickness" is unreasonable and asserts that "desired thickness" is the thickness desired. This argument is not persuasive. Appellants do not specify at what point in the process the thickness achieves the desired thickness. Thus, the "desired thickness" is not necessarily the ultimate final thickness, but may be some intermediate thickness which is desired at some intermediate point in the entire process.

Even if the "desired thickness" were considered to be a desired final thickness, the claims as written are not seen as distinguishing from the prior art as applied. The claims are written in open form using the term "comprising" and may include process steps, such as additional deposition, other than those recited. Independent method claim 110 is not considered to preclude deposition on the second portion while deposition is being carried out on the first portion. Nor is the claim is seen as precluding continued deposition on the first portion while the second portion is being plated. Consequently, if deposition to a desired final thickness were carried out on the first portion, the claim is open to additional deposition on the first portion while the second portion which, as discussed above, is plated at a slower rate than the first portion due to the nonuniformity in plating disclosed by Hirohiko, is plated to the desired final thickness after the first portion reaches the desired final thickness. There is no requirement in the claims as written

that deposition on the first portion be stopped and no additional deposition carried out on the first portion after the desired thickness has been reached.

Appellant further argues that the Examiner's argument with respect toe Hirohiko is based on inherency and asserts that the Examiner has failed to cite explicit disclosure from the Hirohiko reference to support the assertion that different plating rates are used to plate different portion of the metal film. This argument is not persuasive. The rejection is not based on inherency but on a recognition in the art that uniform plating is difficult to achieve and depends on process control. As indicated at paragraphs [0002] and [0003] of the translation of the Hirohiko patent, plating is highly sensitive to the changes of plating conditions. Uniform flow of the plating solution on the wafer surface is difficult to maintain without causing fluctuation. Hirohiko proposes an apparatus and method in which plating solution flow becomes more uniform (page 8, lines 16-18 in paragraph [0011] of the translation). As the flow of the plating solution approaches uniformity, the resulting plating will become more uniform. Absolute uniformity would require perfect process control. While the results of comparative examples show that the apparatus and method of Hirohiko represent an improvement over the prior art, the practical result is still not perfectly uniform. As indicated in paragraph [0028] of the translation, the variation in film distribution (thickness) was 7% with the conventional apparatus of the prior art and 2% with the apparatus of the Hirohiko invention. Thus, there is a difference in the thickness of the plating between a first portion and a second portion which, since plating occurs simultaneously across the wafer, shows that there is a difference in the plating rates at different portions of the wafer.

At page 10 of the Brief, appellant argues that the Van Raalte et al reference does not disclose a second anode as recited in claims 113 and 142. This argument is not considered to be correct. Appellant points to column 3, lines 29-33 which disclose that varying the electrical potential of the article 12 and the modifying electrode 16 permits the ions that would normally migrate toward the article 12 to be selectively drawn toward the modifying electrode 16, and observes that since positive ions are drawn toward the modifying electrode 16 rather than away from it the modifying electrode acts as a cathode rather than an anode. The Examiner concurs. Column 3, lines 34-35 continue "and, if desired, plating on the center of the article 12 can be prevented". This portion of the Van Raalte et al patent pertains to the situation in which it is desired form a deposit which is thicker at the edges than in the center. However, Van Raalte et al is not limited to this situation. At column 1, lines 9-12 Van Raalte et al note that a metal film may be required where the surface is to be substantially flat (i.e., uniform), thicker at the edges or thinner at the edges. Thus, Van Raalte discloses that the opposite situation from that discussed at column 3, lines 29-35 is also desirable. To achieve this opposite result in plating thickness variation where the deposit is thinner at the edges, the polarities of the modifying electrodes and cathode would be reversed. The modifying electrode would be anodic with respect to the workpiece. More broadly, Van Raalte teaches that use of a plurality of modifying electrodes as shown in figure 2 permits an apparatus which can be utilized for a metal film having *any* thickness profile desired (column 3, lines 44-49, emphasis added). This clearly suggests to one of ordinary skill in the art that the modifying electrode may be anodic as well as cathodic with respect to the workpiece.

It should be noted that the Van Raalte patent was cited in the rejection not for the teaching of a plurality of counter-electrodes that are opposed to the workpiece which function as anodes, but for the teaching of independent control with separate power supplies of the counter-electrodes. As indicated above Van Raalte et al teach varying the relative electrical potentials at the article 112, the body 114 of plating material and *each one* of the modifying electrodes 116 to control the thickness profile of the deposit, and show in figure 2 a separate power supply cable to each of the modifying electrodes 116.

Appellant additionally argues that the suggested modification of the Van Raalte and Kubo references would change the basic principles under which the references were designed to operate. This argument is not convincing. Whether one chooses to operate the references in a manner in which the first and second power supplies alternate in providing power pertains to the manner in which the apparatus is used. The manner of operating the device does not differentiate an apparatus claim from the prior art. Apparatus claims must be structurally distinguishable from the prior art. See MPEP 2114. Both Van Raalte et al and Kubo et al patents teach independent control of a plurality of electrodes with separate power supply connections to control the thickness profile of the deposit. Thus, as indicated above, the references teach structure which meets the limitations of the claims. The apparatus of Van Raalte et al and Kubo et al is capable of being operated in a manner in which power is alternately supplied to first and second anodes. Since each of the electrodes of Van Raalte et al and Kubo et al is independently controllable, the power to any of the electrodes may be controlled from zero to full power. Additionally, alternate supply of power could be achieved by operation of an on-

off switch on one or more of the power supplies or, even more basically, unplugging a wall plug to disable one or more of the power supplies. Rather than changing the basic principles under which the references were designed to operate as maintained by appellant, independent control is specifically taught by the references and provides apparatus with the flexibility to meet a wide range of plating situations.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

WL William Leader

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